



THE MUNICIPALITY OF THE VILLAGE OF LIONS BAY

**INFRASTRUCTURE COMMITTEE MEETING
OF THE VILLAGE OF LIONS BAY
HELD ON THURSDAY, OCTOBER 29, 2020 at 7:00 PM
COUNCIL CHAMBERS, 400 CENTRE ROAD, LIONS BAY
AND ELECTRONICALLY VIA ZOOM**

Please register in advance for this meeting:

<https://us02web.zoom.us/meeting/register/tZcod-iprD0iG9KPKPiTRrEkFIIPXhIDi1J9>

Once registered, to access the meeting by Computer, Tablet, or Mobile Device,
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(When prompted, please download Zoom to your device
prior to the meeting if you don't already have the program).

You can also phone in from your landline phone or mobile phone by
dialing 1-778-907-2071 and entering the Conference ID: **835 0112 6816**

AGENDA

- 1. Call to Order**
- 2. Appointment of Recorder**
- 3. Approval of the Agenda**
- 4. Public Questions & Comments**
- 5. Delegations**
- 6. Approval of Minutes**
 - A. Infrastructure Committee Meeting – September 24, 2020 (page 3)
- 7. Business Arising from the Minutes**
 - A. Information Report – Draft 2017 AECOM report re. SCADA Communications Plan – Redacted (page 9)
 - B. Communications Options – Guest Speaker (Tom Dunn, WSP Electrical & SCADA communications Specialist)
- 8. Unfinished Business**

- A. Kelvin Grove WWTP – No Update
 - B. 3 PRV Project – No Update
 - C. Upper Bayview, Bayview Place, Centre Road – No Update
-
- 9. New Business**
 - 10. Public Questions & Comments**
 - 11. Next Meeting:** November 19, 2020
 - 12. Adjournment**



THE MUNICIPALITY OF THE VILLAGE OF LIONS BAY

INFRASTRUCTURE COMMITTEE MEETING OF THE VILLAGE OF LIONS BAY HELD ON THURSDAY, SEPTEMBER 24, 2020 at 7:00 PM COUNCIL CHAMBERS, 400 CENTRE ROAD, LIONS BAY AND ELECTRONICALLY VIA ZOOM

MINUTES

1. Call to Order

The meeting was called to order at 7:08 pm

2. Appointment of Recorder

Norm Barmeier offered and was appointed by the Chair as Recorder for the meeting.

3. Approval of the Agenda

Moved/Seconded

THAT

- (1) Item 7D be considered before Item 7A; and
- (2) the agenda be approved, as amended.

CARRIED

4. Public Questions & Comments

None

5. Approval of Minutes

A. Infrastructure Committee Meeting – June 18, 2020

The following amendments were identified:

- (1) Item 7... Brian's comment regarding communication with resident neighbour to be added in EV charger section.

Moved/Seconded

THAT the minutes of the June 18, 2020 Infrastructure Committee meeting be approved, as amended.

CARRIED

6. Business Arising from the Minutes

- AECOM SCADA report was not sent out, and no contact with Victor yet.

Question asked if Nai heard back from Vancouver coastal health regarding their water/corrosion study. Answer: It's on their to do list, but in light of the Pandemic there will no doubt be a significant delay. The order of the agenda was revised to consider item 7D next.

7. Unfinished Business

7D Communications Tower – Verbal Discussion

- Calling it a comms tower versus a cell tower so as not to bias the direction of the goals for the tower.
- What was the purpose: to ensure connectivity with infrastructure and to facilitate UBC hydrology study
- Define purpose and needs, find tech solution.
- Will a cell tower improve cell service in the Village? Yes.
- Needs: municipalities need to connect with infrastructure. Search and rescue. Karl sent out email with 8 needs.
- Norm is 5G worth exploring? Is 5G a thing that is coming? 5G uses different infrastructure from normal big cell towers.
- Discussion ensued on an antenna at Wade Park that might be a 5G antenna; it's not private it's on BC Hydro pole
- Telus could do 5G network throughout the village? But can 5G help with other needs, such as infrastructure comms and UBCM hydrology equipment.
- Neville reminded that Victor could come to council to educate council with fresh information.
- Tony raised the question of whether communications are needed or if there is a fundamental disconnect between IC and council votes on this. Do we as a bunch of egg heads agree that communications improvement is needed?
- Communications improvement is needed, all agreed. Now chew over options on how to best do that, make a recommendation to council.
- How to get stakeholder engagement and also re-package the solution in a way that meets all the community needs.
- The main objections to the tower were aesthetic and health concerns.
- 8 needs: retail value of the tower was our contribution to UBC study; we have an MOU with them in a contribution agreement; cell reception is unknown (SBA suggests all providers want the space).
- UBC study will have implications beyond the Village, will the Province kick in? Ron doesn't think anyone will pitch in. This study is for long term water security for the Village. Need to identify using Karl's 8 points as to why we need it.
- Nai suggested we look at other options, Victor can present options.
- Tony suggested we need to understand what the community objections are and how to address them.
- Neville noted all the objections are public, there are more than just aesthetic or health. Committee has access to all the public objections online.

- Karl had not thought the tower was going to be a 60m tower either. Examples are Gleneagle tower, which is much shorter. Another one is west van that can do radio and infrastructure comms. Karl does not like 60m tower; there are so many other options. Key is to recognize UBCM study long term, both funding a base for mesh network.
- What are other options are there to improve internet?
- Radio tower, where is it and how tall.
- All in agreement that Victor Wong should make a presentation to the committee
- Fred: questions we need to answer is: PRVs cell or hardwire, 5G, other? Need to focus on establishing our needs...or user requirement specs.
- Nai: Victor will be at next meeting in October if he's available.

7A. Kelvin Grove WWTP – Verbal Update

- Comms issues, Gear issues, galvanizing delayed, still running on temporary, plant has been seeded with KG bacteria.
- Mid to late October is should all be wrapped up.
- How is SCADA connected to works plant? Will be an internet connection; wired. Standard ethernet. Is SCADA full featured? Will you get motor loads? Yes, motor temps, generator temps.
- Is there a turbidity meter on effluent stream? No.

7B. 3 PRV Project – Verbal Update

- Contract awarded to Industria, 28K cheaper. \$735K total contract price. Hydro and scada in addition to this. Contract ready for signing. Notice to proceed will be issued next week. PRV manufacturer has already been notified for shop drawings. Mobilization is dependent on PRV manufacture.
- How much was left over after Harvey tank? Not at fingertips (was in a Council meeting). Is there room for other projects? No.
- Public works project should be sign boarded - Keeps the public aware – to be provided in due course.
- Anticipated completion before end of year.
- Are the kiosks wrapped? Aluminum kiosks no wrap décor selected.
- Do they emit sound? No

7C. 2020 Road Paving – Verbal Update

- BA Blacktop will be engaged to do a lot of roadwork this year 2020. Tentative schedule is week of Oct 5, Upper Bayview and Tidewater way.
- Bayview at around 500 sees an 18" dip in the road which needs attention? Fines have been washed away, water main is a 1968 asbestos cement water main. PW will be extremely careful when repairing that area. BA is going to tear off all pavement, renew gravel base and re-top. Discussion ensued over fines erosion.
- Water main is not OK. Repaving will happen first and when the funds are available the watermain will be replaced and road re-repaired.

- Neville wondered if geotextile can be used to handle fines erosion. Nai will look into it.
- Snow plows are having issue on Bayview, plow blades catching alligatored pavement.
- Snow plows are also having issues on Oceanview, dips can't be cleared.

7E. EV Charger (Page 5)

- If grant obtained, there's still opportunity to negotiate technical terms and location (eg: maybe store would be better)
 - CAO DeJong noted most grants require the infrastructure to be on land owned by the local gov't, but that can be checked since this grant is open to private businesses too. Will also need to consider whether that location would amount to "assistance to a business", which the Community Charter prohibits.
- Norm noted can get 5 years of service agreement covered by grant
- Price of 50-60 kw charging equipment is coming down
- Charging Rates:
 - Most places in Metro are now charging \$0.27/minute (~\$16/hr)
 - You can now charge per kwh if you have a "revenue grade charger"
 - People now used to paying for charging
 - Still trying to work through BC Hydro "demand charges"

8. New Business

A. Preliminary Oceanview Drainage Improvement

- ISL has gone out and done drawings. PW has not had a chance to look at the ISL drawing. PW would like the IC to look at the drawing and give feedback to PW.
- Karl comments: there are no driveway connections? Did they use GIS data. Looks competent, not fantastic. Cost is \$730K.
- Neville questioned the size of the culverts – seems like overkill – may need to consider more practical solution even if it holds higher risk. What are the safety factors. – 1 in 10 year storm design is standard for municipalities.
- Oceanview drainage was/is an issue because of suspicion of slumping, black pipe and re-direction into Rundle, all of which triggered the ISL study. PW has a list a list of other roads that need drainage dealt with before Oceanview. Fred recalls a sinkhole forming at Panorama and Oceanview. PW feels it's been remediated but doesn't mean it won't happen again. Drawing says Pandora instead of Panorama.

B. Upper Bayview, Bayview Place, Centre Road – Design RFP

- Redesign of water main from upper Bayview to Bayview Place/Road to end of Bayview Place down to Centre Road then to Crosscreek Road.
- Those watermains were installed in 1965, upper Bayview is asbestos cement, formation of encrustation has stifled flow.

- Council has approved a 90K budget to do the design. Will be looking at watermain, roadway, and drainage. Project will be the next big grant project. Design will be done for next grant opportunity.
- Bayview DWIProject has already been submitted.

General discussion:

- Water tank 1 year walkthrough will be happening soon
- Tony asked about sludge removal at WWTP - Nai advised laterals were installed.

9. Public Questions & Comments

None

10. Next Meeting: October 22, 2020

11. Adjournment

Moved/Seconded

THAT the September 24, 2020 Infrastructure Committee meeting be adjourned

Meeting Adjourned at 8:53 pm

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THE MUNICIPALITY OF THE VILLAGE OF LIONS BAY

| | | | |
|------------|--|--------------|-------------------|
| Type | Information Report | | |
| Title | 2017 SCADA Communications Strategy (Draft AECOM Report - Redacted) | | |
| Author | Nai Jaffer, PWM | Reviewed By: | Peter DeJong, CAO |
| Date | October 23, 2020 | Version | |
| Issued for | Date of Infrastructure Committee Meeting | | |

Recommendation:

THAT the Information Report, “2017 SCADA Communications Strategy (Draft AECOM Report - Redacted)” be received as background information related to SCADA communications options.

Attachments:

2017 SCADA Communications Strategy (Draft AECOM Report - Redacted)

Key Information:

The draft 30 October 2017 report from AECOM titled SCADA Communication Strategy was prepared during the design of the replacement Harvey Tank, primarily to address how SCADA would communicate between the new tank and the Works Yard. Shortly after the report was commissioned, a decision was made to install conduit from the Oceanview cul-de-sac to the new plant thereby reducing the priority of finalizing this report.

Also, note that the capital costs in the report relate directly to the CWWF project at the time (new Harvey Tank, PRV at Phase IV and V site, and PRV at the Highway Tank Site) thus the table of costs only considers 3 telephone line costs or 3 cellular modem costs, or 3 radio system control points). They are also class “C” estimates and do not include the engineering and design of the communications system.

Please note that the report contains some sensitive information about our critical infrastructure and has been redacted in accordance with the *Freedom of Information and Protection of Privacy Act*. Discussion of any redacted portions of the draft report would need to take place in Closed meeting. Please bear this in mind during the Open meeting.

Follow Up Action: To be determined.

Memorandum

| | | | |
|-------------|---|----------------|------------------|
| To | Mr. Naizam Jaffer | Page | 1 of 8 |
| CC | Andreea Irimia, P.Eng. | | |
| Project | Village of Lions Bay – Water Reservoirs | | |
| Subject | SCADA Communication Strategy | | |
| From | Kyle Blaney | | |
| Reviewed By | Graham Walker, P.Eng. & Laurence Stan, P.Eng. | | |
| Date | 30 October 2017 | Project Number | 60546407 (434.3) |

1. Introduction

The Village of Lions Bay (“Municipality”) is in the process of constructing new water infrastructure within their water distribution system and will require the resultant instrumentation and processes to be integrated into their existing SCADA system. Flow monitoring, process set points, tank level information, and related data will need to be transmitted across a communications system to the Works Yard SCADA.

2. Purpose

The information and analysis presented in this memo addresses the Municipality’s existing SCADA system challenges, infrastructure limitations and site-specific constraints. The objective of this memo is to evaluate and compare the communication options available on the market to determine the most suitable network upgrade for future expansion, while being cost effective to improve the reliability of the Municipality’s present and future SCADA system requirements. Note that this memo is a high-level comparison of communication options and does not constitute a SCADA master plan.

The Municipality presently has a total of seventeen (17) existing water infrastructure sites including the Public Works Yard, water storage facilities, and PRV station locations which all may be added to the SCADA system in the future. A diagrammatic representation of this system is in **Figure 1**. As with any system, the SCADA communications system will need to be flexible enough to allow for changes such as the pending removal of the Phase IV and V tanks or the addition of the Upper Bayview PRV and Mountain Drive control valve.

3. Background Info

The Municipality's existing SCADA network connects the Harvey Creek reservoir to the Works Yard [REDACTED]

The existing communications system has suffered significant and periodic disruptions caused by wind storms [REDACTED]

The Municipality's staff accesses the SCADA network through a VPN connection [REDACTED]

4. Key Challenges

Some of the identified key site challenges and issues are:

- Steep topography putting limitations on strength and type of spread spectrum or licensed radio communication signals
- Sprawling Municipality town site with control infrastructure dispersed throughout including remote and, at times, inaccessible sites
- Dense and tall tree cover throughout the Municipality
- Difficult site access for supply reservoirs above the Municipality
- Old telecommunication infrastructure servicing the Municipality

5. SCADA Communication Options

The two broad categories of SCADA data transmission and communications are hardwired and wireless systems.

- Hardwired
 - Telephone [REDACTED]
 - Fiber optic
- Wireless
 - Radio;
 - Cellular/Satellite;

requirements through Industry Canada and anyone can purchase, install, activate, and retune a system as needed.

Spread Spectrum requires direct line of sight between the transmitter and receiver, which means that the signal can be dramatically affected by physical interference like trees, foliage, buildings, and mountains. Due to this, typical antennae are very tall in order to transmit over obstacles. A drawback to Spread Spectrum is the fact that it is unregulated and signals are prone to interruption by other equipment using the same frequency.

Licensed radio is similar to Spread Spectrum, with a couple of key differences.

1. Licensed Radio is governed and regulated by Industry Canada and requires a permit to operate on a given frequency, and
2. Licensed Radio typically falls within the 500MHz range with power levels of up to 10W.

Thanks to the increased broadcasting power, Licensed Radio does not have the strict line of site requirements as spread spectrum and since it is regulated, Industry Canada ensures that signals are not interfered with.

For both Spread Spectrum and Licensed Radio, after initial equipment costs, there are no repeating costs other than maintenance. Additionally, the topography of the Municipality Lions Bay offers many challenges to implementing a license-free radio network to support SCADA communications. This technology requires direct or near line of sight facilitate reliable communication and transmission of data and consequently requires the construction of a large tower. Additional infrastructure in the form of a repeater site may also be required to achieve line of site between the reservoirs and the works yard. Strategically placed, this repeater site would offer itself to future installations requiring a SCADA connection.

Radio communication provides the benefit of a private system including independence and scalability. However, maintenance of the system would be borne entirely by the Municipality and would need to include the provision of power to a repeater station which might, for example, be located on Gambier Island, across Howe Sound.

5.2.2 Cellular

Similar to radio, cellular communication is impacted by and has challenges associated with the topography of the Municipality. Cellular reception may also be affected by other factors including system availability and capacity, equipment type, signal strength, and environmental conditions. Further study would be required to determine the viability of this solution. Redundancy may be achieved using Satellite as a fail over mechanism but the costs of doing so is prohibitive.

Just as with individual cellular phone use, employing a cellular modem at any site would incur a monthly subscription cost to access the network for each specific site.

Obviously, the primary limitation of cell coverage is just that: coverage. Without adequate coverage, a cellular based system will not function. Spotty connectivity will result in data loss and missed alarms which could be catastrophic to SCADA operations. Both Rogers and TELUS offer coverage in the Lions Bay area and are just two examples of service providers. The Municipality has indicated that they have had preliminary discussions with cellular tower companies which are, in turn, reviewing the market demand for increased cellular coverage in within the boundaries of Lions Bay.

- 4G LTE
 -  LTE Advanced — Ultra-fast[†]
 -  LTE — Super-fast[†]
 -  LTE Future
- 4G HSPA+
 -  HSPA+ — Fast[†]
 -  HSPA+ Future



Figure 2 - TELUS CELLULAR NETWORK COVERAGE



Figure 3 - ROGERS CELLULAR NETWORK COVERAGE

6. Cost Comparison Analysis

The following section outlines high level estimated capital expenditures (CAPEX) and operating expenditures (OPEX) for the options as discussed in the previous section. These estimates do not include system design and field-testing. Table 1 provides an estimate for the costs as they relate to the Clean Water and Wastewater Fund (CWWF) project currently in the design phase and should be considered a

Class C estimate. We have included the estimated operating cost for the system over a 20-year period, including a 2% average annual inflation rate.

Table 1: SCADA Communication Network Cost Comparison

| | Construct ion Capital Cost (CAPEX) | Annual Operating Cost (OPEX) | 20 Year Period OPEX Cost | Total Cost |
|--|---|---|---|-------------------|
| Option 1 – Telephone | | | | |
| Telephone line installation & connection | \$3,500 | | | |
| Install 650m of Conduit @ \$250/m | \$162,500 | | | |
| 3 x Unlimited phone plan - \$48/mo | | \$2,000 | \$51,570 | |
| Option 1 Totals | \$166,000 | | \$51,570 | \$217,570 |
| Option 2 – Radio | | | | |
| Repeater Site (Gambier Island ,base cost) | \$60,000.00 | | | |
| Existing Site modifications (control panel, antenna tower, cabling, duct work, control panel modifications, etc) x 3 sites | \$15,000.00 | | | |
| Maintenance (battery maintenance, Inspections to repeater site (monthly)) | | \$15,000 | \$386,750 | |
| Option 2 Totals | \$75,000 | | \$386,750 | \$461,750 |
| Option 3 – Cellular* | | | | |
| Infrastructure improvements (3 x TELUS Smart Hub, cabling, antenna, control panel modifications) | \$5,000 | | | |
| SCADA configuration | \$10,000 | | | |
| Subscription fees (3 x Mobile Internet (+\$0.05/MB)) | | \$3,000 | \$77,350 | |
| Option 3 Totals | \$10,000 | | \$77,350 | \$87,350 |

*Monthly rate based upon limited data. Additional sites and increased data transfer will require a more robust plan.

7. Strengths and Weaknesses

The following matrix indicates each system’s advantages and disadvantages.

| SCADA Communication Option | Strengths | Weaknesses |
|-----------------------------------|---|---|
| Option 1: Telephone | <ul style="list-style-type: none"> - No increased operating expenditures | <ul style="list-style-type: none"> - Reliant on third party (utility) network that is prone to failure - Offers no advantage to expanding SCADA network |
| Option 2: Radio | <ul style="list-style-type: none"> - No subscription fees - Not reliant on third party network | <ul style="list-style-type: none"> - Provides scalable network opportunities - Requires significant infrastructure and the development of a repeater site - Requires ongoing maintenance |
| Option 3: Cellular | <ul style="list-style-type: none"> - Less prone to weather disturbances than Option 1 - Minimally invasive infrastructure | <ul style="list-style-type: none"> - Reliant on third party (utility) network - Increased subscription, increased operating costs over existing telephone bills |

8. Summary

The driving factor for this Technical Memorandum was to discuss and address the key communication transmission options for the Municipality’s SCADA communication system prior to the implementation of the CWWF infrastructure.

As previously mentioned, these technologies are not mutually exclusive and the Municipality should consider each site on a case-by-case basis. For example, the installation of SCADA at a PRV station primarily for monitoring purposes may benefit from the installation of a TELUS connection which comes with a lower operating cost. Since this would not be deemed to be a critical site the loss of power and or connection will have a relatively minor impact on operations. Conversely, the installation of an automated control valve may necessitate a cellular communication solution due to its criticality to the system and the resultant impacts of downtime and signal strength must be accounted for in the site selection for this station.

With respect to the Harvey Tank site, since conduit is required for the provision of a reliable power supply, it is recommended that an additional conduit be included in the scope of work in order to accommodate a hard wire connection for the treatment

plant. The PRV's at Upper Bayview, Mountain Drive, and Highway Tank sites are most conducive for cellular infrastructure; however, signal strength may preclude this technology.

DRAFT